

STEREO MOC Status Report
Time Period: 2014:300 - 2014:306

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 302, no real-time science telemetry was downlinked as the scheduled 70 meter support with DSS-14 was changed to a 34 meter support with DSS-35 in support of the STEREO Behind communication recovery. Also, command uplink was two hours late and was resolved after the station reset CMG. See DR #C110674 for more information.
- On day 304, no real-time science telemetry was downlinked as the scheduled 70 meter support with DSS-43 was changed to a 34 meter support with DSS-55 in support of the STEREO Behind communication recovery.

2. The following spacecraft/instrument events occurred during this week. Note that the Ahead observatory is operating on the first side lobe of the HGA to prevent overheating of the HGA feed assembly.

- The average daily science data return for Ahead, while operating on the first side lobe on the HGA, was 40 Mbits during this week.

STEREO Behind (STB) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 301, during the DSS-43 support, communications with the antenna interface were lost for eight minutes beginning at 2241z. See DR #C110672 for more information.

2. Detailed status of the activities that occurred on the Behind loss of communication anomaly, which occurred on day 274, are listed below. To ensure communications on the LGA during long term recovery efforts, the Behind track coverage will be reduced to 3 hour 70 meter supports for 3 days in a row each week commencing in week 46, on November 10th.

- On days 300 through 301, during the DSN 70 meter support each day, contingency commanding continued with ensuring that IMU-A is disabled as it has failed. No signal was received by the DSN radio science receivers.

- On days 302 through 306, during the DSN 70 meter supports, recovery commanding was switched back to ensuring that the transmitter is in its operational configuration. No signal was received by the DSN radio science receivers.

Significant findings to date:

1. Analysis of the three DSN extracted telemetry frames from the carrier signal just before the planned observatory reset/anomaly occurred on day 274, October 1st, showed nominal performance of the spacecraft, i.e., no anomalies, IMU off, and the star tracker providing an attitude solution.
2. Post reset, from the very limited telemetry, three packets, extracted from the carrier signal by the DSN, the X-axis gyro on IMU-A had failed. Unfortunately, this telemetry contained only G&C anomaly data and no spacecraft summary data, i.e., the state of the RF, G&C, fault protection and other subsystems is not known at the time of the anomaly. With a failed IMU and the star tracker being off-line for an undetermined duration, the sun sensors will keep the observatory pointed at the Sun, though the G&C will not have any roll knowledge, and cannot roll the observatory as part of the safing configuration to re-establish communications on the LGAs. From analysis of this telemetry and initial G&C simulations, it is highly suspected that the observatory is rotating about the principal axis of inertia due to an autonomous momentum dump initiated by bad gyro data flagged good, but this has not yet been confirmed.
3. At least two anomalies occurred post reset, the star tracker not promoting to AAD mode and the X-axis gyro failure. Unfortunately, due to the number of possible combinations, the STEREO fault protection system is not designed for simultaneous failures.

The cause and effect analysis of the loss of communications from the LGAs is continuing. G&C simulations using the bad gyro data flagged good are continuing to better understand the potential impact to the observatory state. Recovery from a negative power state is also being investigated.

Once communications are restored and the anomaly resolved, the operational plan for exiting the solar conjunction testing will continue to return the Behind observatory back to nominal science data collection as soon as safely possible.